

Reflect-IT –Sample Solutions

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NOWnTHEN

... for reference purposes:

Print: "We are going to count in turn"

Print: "until one of us makes an error."

Print: "When we get to a number that is"

Print: "divisible by 5, then we will substitute"

Print: "the number with the word: 'Now'."

Print: "When we get to a number that is"

Print: "divisible by 7, then we will substitute"

Print: "the number with the word: 'Then'."

Print: "For example: 1 - 2 - 3 - 4 - Now - 6 - Then - 8..."

Print: " and: 32 - 33 - 34 - Now and Then - 36"

Print: "Let me start..."

Print: "1"

Print: "Your turn..."

(Continued next page)

ALGORITHM

... let's consider substituting only numbers divisible by 5.

... find the logic error contained in the algorithm below:

```
Set CurrentNumber equal to 1
Set IsCorrect equal to TRUE
Set AnswerSuggested equal to 0

While IsCorrect (...is equal to TRUE)
    If the CurrentNumber is divisible by 5 then
        Print: "Computer says: " & CurrentNumber    (ie: Computer says: 1)
    Else
        Print: "Computer says: " & CurrentNumber    (ie: Computer says: 1)
    End If

    Increment CurrentNumber    (ie: currentNumber = currentNumber +1)
    Print: "Your turn: "
    Read in AnswerSuggested

    If (CurrentNumber is divisible by 5)
        If (AnswerSuggested is equal to 'Now') then
            Increment CurrentNumber
        Else
            Set IsCorrect equal to FALSE
    Else
        If (AnswerSuggested is equal to CurrentNumber) then
            Increment CurrentNumber
        Else
            Set IsCorrect equal to FALSE
    End If
    (Note: mod gives the remainder after a division. EG: 13 / 4 = 3 r 1. Thus: 13 mod 4 = 1)

If CurrentNumber is greater than 25 then
    Print: "Well done! We got to: " & CurrentNumber
Else
    Print: "There's room for improvement. We only got to: " & CurrentNumber
End If
```

The logic error: The last If/Else items are the wrong way around. Should be:

```
If CurrentNumber is greater than 25 then
    Print: "Well done! We got to: " & CurrentNumber
Else
    Print: "There's room for improvement. We only got to: " & CurrentNumber
End If
```

BASIC

... find the logic error contained in the program below:

```
REM Example 'Now' and 'Then' Program, without: 'Then'

CLS

LET CurrentNumber = 1
LET IsCorrect = 1
LET AnswerSuggested$ = "N/A"

WHILE IsCorrect = 1
    PRINT "Computer Says: ", CurrentNumber

    CurrentNumber = CurrentNumber + 1
    PRINT
    PRINT "Your Turn: ",
    INPUT AnswerSuggested$

    IF CurrentNumber MOD 5 = 0 THEN
        IF AnswerSuggested$ = "Now" THEN
            CurrentNumber = CurrentNumber + 1
        ELSE
            IsCorrect = 0
        END IF
    ELSE
        IF CurrentNumber = VAL(AnswerSuggested$) THEN
            CurrentNumber = CurrentNumber + 1
        ELSE
            IsCorrect = 0
        END IF
    END IF
END IF

WEND

PRINT
PRINT "Sorry your last answer was incorrect."
IF CurrentNumber > 25 THEN
    PRINT "Well Done!"
ELSE
    PRINT "There's room for improvement."
END IF
PRINT "We got to: ", CurrentNumber
```

The logic error: An initial If/Else is missing. Should be:

```
WHILE IsCorrect = 1
    IF CurrentNumber MOD 5 = 0 THEN
        PRINT "Computer Says: ", "Now"
    ELSE
        PRINT "Computer Says: ", CurrentNumber
    END IF
```

PASCAL

... find the logic error contained in the program below:

```
PROGRAM NowAndThen (input,output);

VAR
    CurrentNumber : Integer;
    IsCorrect: Boolean;
    AnswerSuggested: String[4];
    as_int: integer;
    as_errorcode: integer;

BEGIN
    CurrentNumber := 5;
    IsCorrect := true;
    AnswerSuggested := '';

    Writeln;

    IF (CurrentNumber mod 5 = 0)
        THEN Writeln('Computer Says: Now')
        ELSE Writeln('Computer Says: ',CurrentNumber);

    CurrentNumber := CurrentNumber + 1;
    Write('Your turn: ');
    Readln(AnswerSuggested);

    IF (CurrentNumber mod 5 = 0) THEN
    BEGIN
        IF (AnswerSuggested = 'Now')
            THEN CurrentNumber := CurrentNumber + 1
            ELSE IsCorrect := false
    END
    ELSE
    BEGIN
        Val(AnswerSuggested,as_int,as_errorcode);
        IF (as_int = CurrentNumber)
            THEN CurrentNumber := CurrentNumber + 1
            ELSE IsCorrect := false;
    END

    Writeln('Sorry, your last answer is incorrect. ');
    IF CurrentNumber > 25
        THEN Write('However well done! ')
        ELSE Write('There is room for improvement. ');
    Writeln('We got to: ',CurrentNumber);

    Readln(AnswerSuggested);

END.
```

The logic error: The WHILE loop is missing. Should be:

```
WHILE (IsCorrect = true) DO
BEGIN
    ...
END;
```

C

... find the logic error contained in the program below:

```
main()
{
    int CurrentNumber = 1;
    int IsCorrect = 0;
    char AnswerSuggested[4];

    while (IsCorrect == 1)
    {
        if(CurrentNumber % 5 == 0)
        { printf("Computer says: Now\n\n"); }
        else
        { printf("Computer says: ",CurrentNumber,"/n/n"); }

        CurrentNumber = CurrentNumber + 1;
        printf("Your turn: ");
        scanf("%s",AnswerSuggested);

        if(CurrentNumber % 5 == 0)
        {
            if(AnswerSuggested == "Now")
            { CurrentNumber = CurrentNumber + 1; }
            else
            { IsCorrect = 0; }
        }
        else
        {
            if((int)(AnswerSuggested) == CurrentNumber)
            { CurrentNumber = CurrentNumber + 1; }
            else
            { IsCorrect = 0; }
        }
        printf("\n\nf");
    }

    printf("Sorry, your last answer is incorrect.\n");
    if(CurrentNumber > 25)
    { printf("Well done! "); }
    else
    { printf("There is room for improvement. "); }
    printf("We got to: ",CurrentNumber,"\n");

    scanf ("%s", AnswerSuggested);
}
```

The logic error: The IsCorrect is set to 0 in the declarations section. Should be:

```
int IsCorrect = 1;
```

JAVA

... find the logic error contained in the program below:

```
import java.util.Scanner;

public class NowNThen
{
    public static void main(String[] args)
    {
        int intCurrentNumber = 1;
        int intAnswerSuggested = 0;
        String strAnswerSuggested = "";
        boolean isCorrect = true;

        Scanner in = new Scanner(System.in);

        while(isCorrect)
        {
            if(intCurrentNumber % 5 == 0)
            { System.out.println("Computer says: " + intCurrentNumber; }
            else {System.out.println("Computer says: Now"); }

            intCurrentNumber++;
            System.out.print("Your turn: ");
            strAnswerSuggested = in.nextLine();

            try
            { intAnswerSuggested = Integer.parseInt(strAnswerSuggested); }
            catch (Exception e)
            { intAnswerSuggested = 0; }

            if(intCurrentNumber % 5 == 0)
            {
                if(strAnswerSuggested.equals("Now")) { intCurrentNumber++; }
                else {isCorrect = false; }
            }
            else
            {
                if(intAnswerSuggested == intCurrentNumber) { intCurrentNumber++; }
                else { isCorrect = false; }
            }
        }
        System.out.println("Sorry, your last answer is incorrect.");
        if(intCurrentNumber > 25) { System.out.print("However, well done! "); }
        else { System.out.print("There is room for improvement. "); }
        System.out.println("We got to: " + (intCurrentNumber));
    }
}
```

The logic error: The closing If/Else items are the wrong way around. Should be:

```
If CurrentNumber is greater than 25 then
    Print: "Well done! We got to: " & CurrentNumber
Else
    Print: "There's room for improvement. We only got to: " & CurrentNumber
End If
```

UPDATES

... and so I further challenge you:

Is it fair to say that the computer
 will always be the winner of this game,
the outcome, it would seem,
 would fairly much remain the same.

So how might we go about
 stacking the odds more to our favour;
how might we alter the consistency
 of the computer's programmed behaviour?

Sample considerations:

You may need to randomise the response from the computer when the program gets to a number divisible by 5 or 7.

The random function would potentially only decide whether the answer is the next number (ie: the next number divisible by 5 or 7), or whether the computer responds with the appropriate: Now or Then.

The randomiser might need to be such that the computer only makes the incorrect decision on occasion, not often.

The algorithm utilised and demonstrated
on the last several pages,
may not be the author's best, could well,
be improved upon in considered stages;

Maybe the loop, the if statements,
or maybe the program's flow;
contemplate an improved algorithm,
take up this challenge and give it a go...

Left as an exercise for you...

The algorithm, with a focus on 5, and
not 7, remains somewhat incomplete;
the activity has this further layer,
a shortcoming that we could meet;

So if you feel you may be able,
and are keen to add some code;
i could leave this with you,
to take on this additional workload...

Sample java code:

```
import java.util.Scanner;

public class NowNThen_2
{
    public static void main(String[] args)
    {
        int intCurrentNumber = 30;
        int intAnswerSuggested = 0;
        String strAnswerSuggested = "";
        boolean isCorrect = true;

        Scanner in = new Scanner(System.in);

        while(isCorrect)
        {
            if(intCurrentNumber % 5 == 0)
            {
                System.out.println("Computer says: Now");
            }
            else if(intCurrentNumber % 7 == 0)
            {
                System.out.println("Computer says: Then");
            }
            else if(intCurrentNumber % 5 == 0 && intCurrentNumber % 7 == 0)
            {
                System.out.println("Computer says: Now and Then");
            }
            else
            {
                System.out.println("Computer says: " + intCurrentNumber);
            }

            intCurrentNumber++;
            System.out.print("Your turn: ");
            strAnswerSuggested = in.nextLine();

            try
            {
                intAnswerSuggested = Integer.parseInt(strAnswerSuggested);
            }
            catch (Exception e)
            {
                intAnswerSuggested = 0;
            }
        }
    }
}
```

```

        if(intCurrentNumber % 5 == 0 && intCurrentNumber % 7 == 0)
        {
            if(strAnswerSuggested.equals("Now and Then"))
            {
                intCurrentNumber++;
            }
            else
            {
                isCorrect = false;
            }
        }
        else if(intCurrentNumber % 5 == 0 || intCurrentNumber % 7 == 0)
        {
            if((intCurrentNumber % 5 == 0 && strAnswerSuggested.equals("Now"))
                || (strAnswerSuggested.equals("Then") && intCurrentNumber % 7 == 0))
            {
                intCurrentNumber++;
            }
            else
            {
                isCorrect = false;
            }
        }
        else if(intAnswerSuggested == intCurrentNumber)
        {
            intCurrentNumber++;
        }
        else
        {
            isCorrect = false;
        }
    }

    System.out.println("Sorry, your last answer is incorrect.");
    if(intCurrentNumber > 35)
    {
        System.out.print("However, well done! ");
    }
    else
    {
        System.out.print("There is room for improvement. ");
    }
    System.out.println("We got to: " + (intCurrentNumber));
}

}

```